

# M2T-25-4-1-L Optical Gigabit Ethernet/Fibre Channel 850nm SFF LC 2x5 Dual Transmitters - 1.25/1.0625GBaud -- +3.3V



## ORDERING INFORMATION

M2T - 25 - 4 - 1 - L

+3.3V POWER SUPPLY

WAVELENGTH  
1 - 850 nm (multimode)

PROTOCOL  
4 - GbE/FC, 1.25/1.0625GBaud



## Optoelectronic Products

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## Features

- 1.25 Gbps Gigabit Ethernet Compliant
- 1.0625Gbps Fibre Channel Compliant
- Metalized Plastic Package
- AC coupled PECL level Inputs
- Low profile fits Mezzanine Card Applications
- Single +3.3V Power Supply
- Wave Solderable / Aqueous Washable
- Class 1 Laser Safety Compliant
- UL 1950 Approved

## PRODUCT OVERVIEW

The M2T-25-4-1-L Small Form Factor (SFF) optical dual transmitter modules are high performance integrated duplex data links for uni-directional communication over multimode optical fibre. The M2T-25-4 module is specifically designed to be used in Gigabit Ethernet/ Fibre Channel applications. The M2T-25 dual transmitter modules are provided with the LC receptacle that is compatible with the industry standard LC connector. The Stratos Lightwave SFF dual transmitter modules measure 0.532 inches in width. These modules provide double port densities by fitting twice the number of dual transmitter modules onto the same board as compared to a 1x9 transceiver. This saves on system costs and can reduce overall design time.

This optoelectronic dual transmitter module is a class 1 laser product compliant with FDA Radiation Performance Standards, 21 CFR Subchapter J. This component is also class 1 laser compliant according to International Safety Standard IEC-825-1.

## SHORT WAVELENGTH LASER

The use of short wavelength VCSELs (Vertical Cavity Surface-Emitting Laser) and high volume production processes has resulted in a low cost, high performance product available in various data transfer rates up to 1.25 GBaud.

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTES
Storage Temperature	Tstg	-40	+85	°C	
Soldering Temperature			260	°C	10 seconds on leads only
Supply Voltage	V <sub>cc</sub> T, V <sub>cc</sub> R		6.0	V	VCC - ground
Data AC Voltage	Tx+, Tx-		2.6	V <sub>pp</sub>	Differential
Data DC Voltage	Tx+, Tx-	-10	10.0	V <sub>pk</sub>	V (Tx+ or Tx-) - ground

## RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Operating Case Temperature	Ta	0		+70	°C	
Supply Voltage	Vcc	3.0	3.3	3.6	VDC	
Baud Rate	Brate	1.0625		1.25	GBaud	

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### MODULE SPECIFICATIONS - ELECTRICAL

0°C<Tc<70°C, +3.0<Vcc<+3.6V

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Supply Current	Icc		120	135	mA	Tc=+25°C; Vcc=+3.3V
				150	mA	0°C<Tc<+70°C; +3.0V<Vcc<+3.6V
TRANSMITTER						
PECL Inputs (Differential)		400		2500	mVpp	AC coupled inputs
TX_DISABLE input Voltage - HIGH	V <sub>IH</sub>	2.0		Vcc+0.3	V	
TX_DISABLE input Voltage - LOW	V <sub>IL</sub>	0		0.8	V	

### M2T-25-4-1-L OPTICAL SPECIFICATION -- 850 nm Laser Multimode

0°C<Tc<70°C, +3.0<Vcc<+3.6V

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
50µm Core Diameter MMF		550	1000		m	BER<1.0E-12 @ 1.25/1.0625GBaud
62.5µm Core Diameter MMF		300 <sup>1</sup>	500			
TRANSMITTER						
Optical Center Wavelength	λ	830	850	860	nm	
Spectral Width	Δλ			0.85	nm	RMS
Optical Transmit Power	Popt	-9.5		-2 <sup>2</sup>	dBm	Average @ 850nm
Extinction Ratio	ER	9			dB	P1/P0
Optical Modulation Amplitude	OMA	180			µW	pk-pk
Relative Intensity Noise	RIN			-117	dB/Hz	
Total Jitter	TJ			170	ps	Measured with 2 <sup>7</sup> - 1 PRBS
Output Rise/Fall Time	t <sub>R</sub> , t <sub>F</sub>			260	ps	20-80%; measured unfiltered

Note<sup>1</sup> - This is the link length for at least 95% of the installed fibre base.

Note<sup>2</sup> - Lessor of class 1 laser safety limits (CDRH and EN 60825) or receiver power, max.

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## TERMINATION CIRCUITS

Inputs to the M2T-25 transmitter are AC coupled and internally terminated through 50 ohms to AC ground. These transceivers can operate with PECL logic levels. The input signal must have at least a 400mV peak-to-peak (single ended ) signal swing. Different termination strategies may be required depending on the particular Serializer chip set used.

The M2T-25 product family is designed with AC coupled data inputs to provide the following advantages:

- Close positioning of serializer with respect to transmitter; allows for shorter line lengths and at gigabit speeds reduces EMI.
- Minimum number of external components.
- Internal termination reduces the potential for unterminated stubs which would otherwise increase jitter and reduce transmission margin.

Subsequently, this affords the customer the ability to optimally locate the serializer as close to the M2T-25 as possible and save valuable real estate on PCI cards and other small circuit assemblies. At gigabit rates this can provide a significant advantage resulting in better transmission performance and accordingly better signal integrity.

AC coupling allows the Stratos Lightwave M2T-25 to be applied across a wider range of applications without modification. This benefits users in terms of enhanced RF performance, reduced component count, tighter layout and fewer design problems. Figure 1 illustrates the recommended transmit data line terminations.

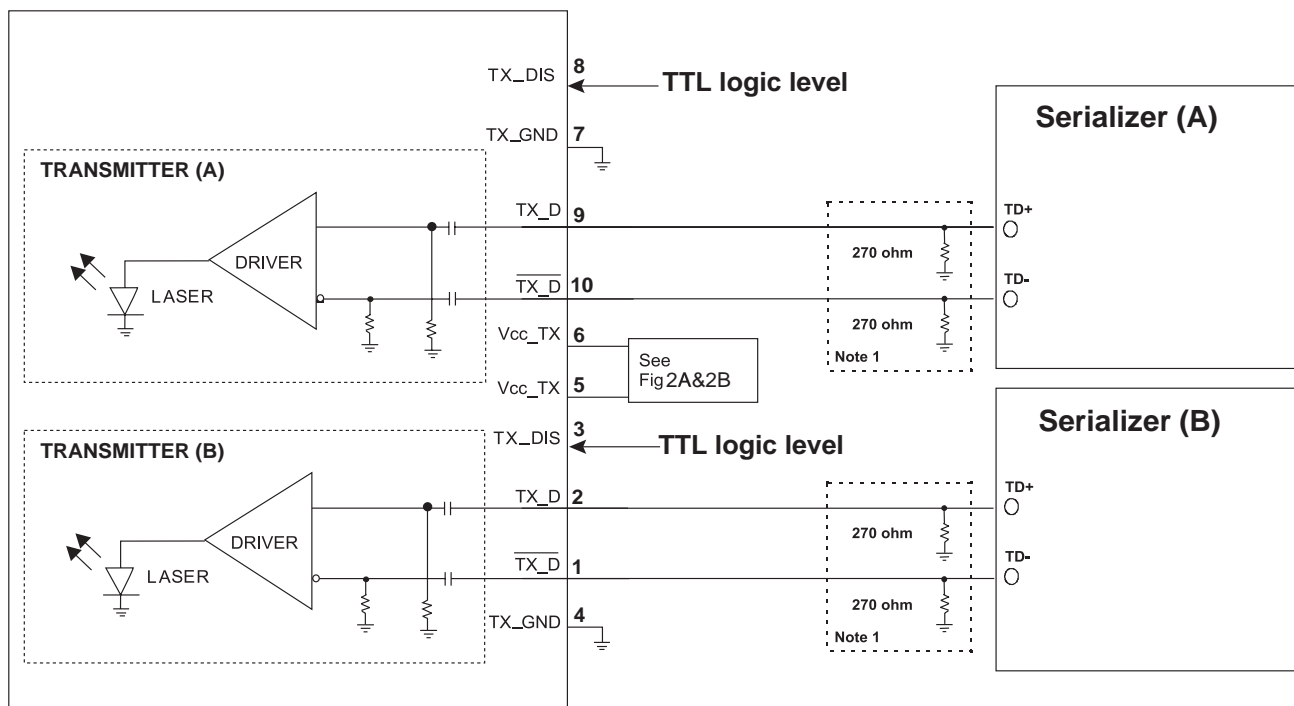


Figure 1. Recommended TRANSMIT Data Terminations

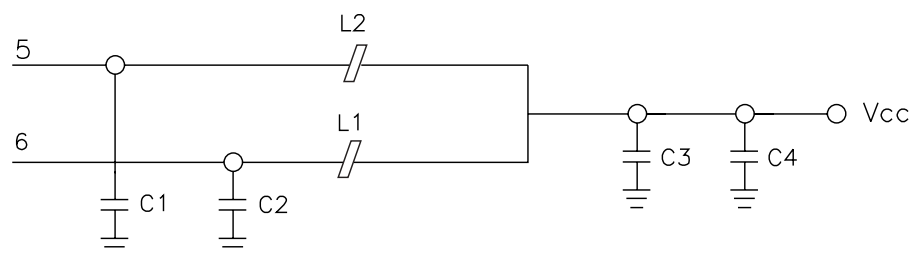
Note 1. Consult the Serializer manufacturer's applications information for biasing required for Tx outputs. Some serializer outputs are internally biased and may not need external bias resistors.

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## POWER COUPLING

A suggested layout for power and ground connections is given in figure 2B below. Connections are made via separate voltage and ground planes. The mounting posts are at case ground and should not be connected to circuit ground. The ferrite bead should provide a real impedance of 220ohms at 100 MHz. Bypass capacitors should be placed as close to the 10-pin connector as possible.



Values:

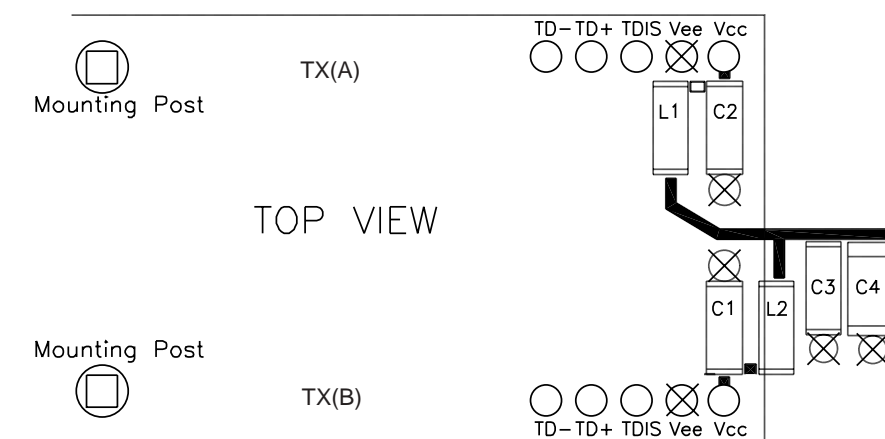
C1, C2 = 1000pF, COG

C3 = 0.1μF

C4 = 10μF, Tantulum

L1, L2 = Real Impedance of 220Ω @ 100MHz

**Figure 2A. Suggested Power Coupling - Electrical Schematic**



Values:

C1, C2 = 1000pF, COG

C3 = 0.1μF

C4 = 10μF, Tantulum

L1, L2 = Real Impedance of 220Ω @ 100MHz

Note:

(1) Components shown are placed on the bottom layer and are viewed through the board.

LEGEND:

- ⊕ Vcc Plane Connection
- ⊗ Circuit Ground Connection
- ⊙ Case Ground

**Figure 2B. Suggested Power Coupling - Component Placement**

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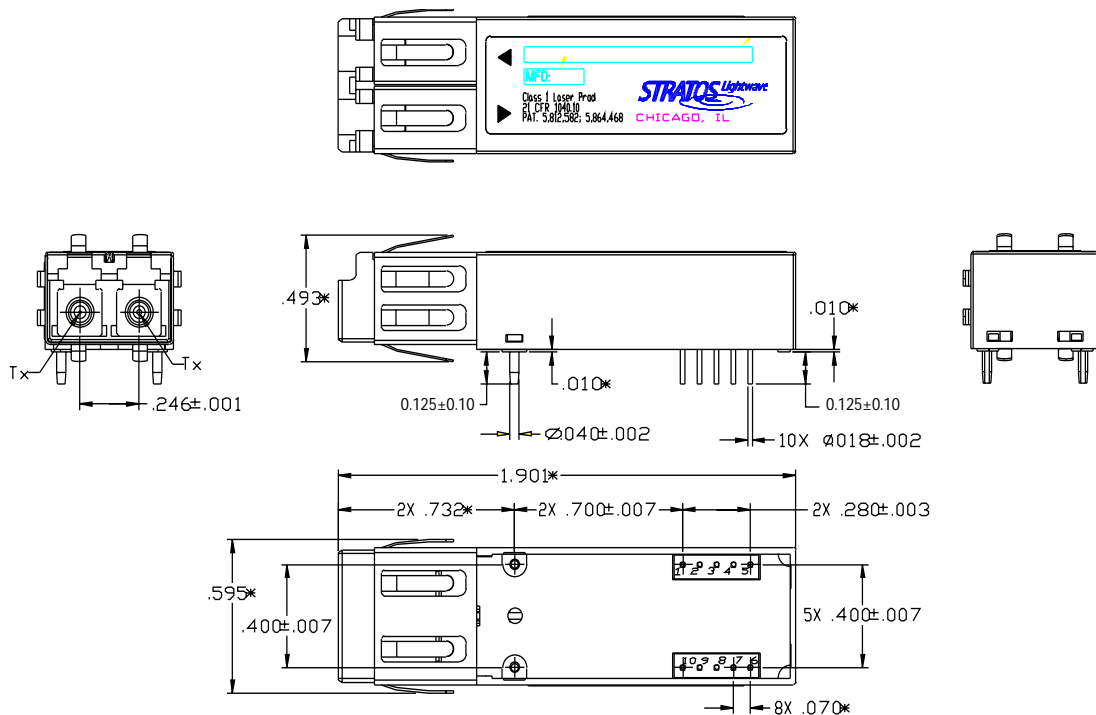


## EMI and ESD CONSIDERATIONS

Stratos Lightwave optoelectronic dual transmitter module offer a Metalized plastic case and special chassis grounding clips. As shown in the drawing, grounding clips connect the module case to chassis ground when installed flush through the panel cutout. The grounding clip in this way brushes the edge of the cutout in order to make a proper contact. The use of a grounding clip also provides increased electrostatic protection and helps reduce radiated emissions from the module or the host circuit board through the chassis faceplate. The attaching posts are at case potential and may be connected to chassis ground. They should not be connected to circuit ground.

Plastic optical subassemblies are used to further reduce the possibility of radiated emissions in multimode dual transmitter module. By providing a non-metal receptacle for the optical cable ferrule, the gigabit speed RF electrical signal is isolated from the connector area thus preventing radiated energy leakage from these surfaces to the outside of the panel.

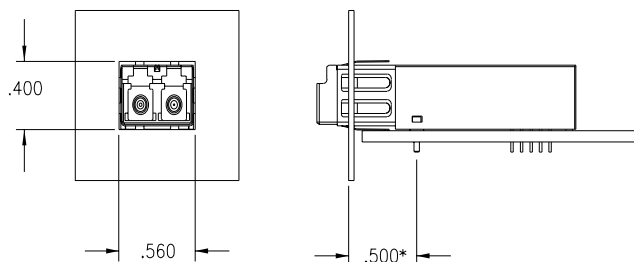
## MECHANICAL DIMENSIONS



NOTES:

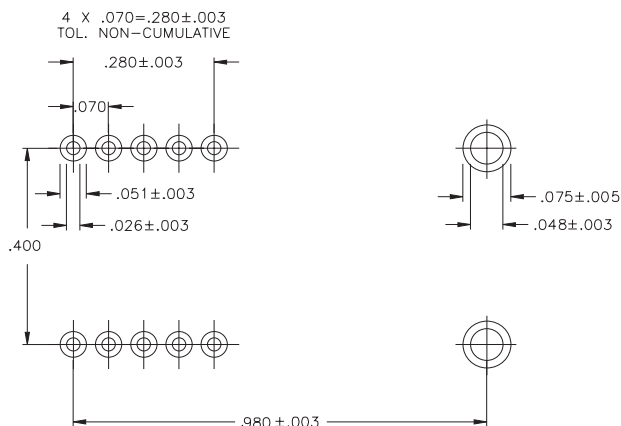
\* DIMENSIONS ARE FOR REFERENCE

## PANEL CUTOUT DIMENSIONS



\*DIMENSION REFERRED TO OUTSIDE WALL

## SUGGESTED PCB LAND PATTERN



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### PHYSICAL DESCRIPTION

The M2T-25 features a compact design with a standard LC duplex connector for fibre optic connections. The 10-pin connector (70 mil spacing) provides the electrical connection for all operation. With a height of 9.8 mm the M2T-25 fits mezzanine card applications. Two wave-solderable posts are provided for attaching the package to the circuit board without the need for multiple attachment operations.

### ELECTRICAL INTERFACE, PIN DESCRIPTIONS

PIN 1	TD-	Transmitter Data Inverted Differential Input (B)
PIN 2	TD+	Transmitter Data Non-Inverted Differential Input (B)
PIN 3	TX_DIS	Transmitter Disable (B)
PIN 4	TX_GND	Ground (B)
PIN 5	Vcc_TX	+3.3 volt supply for the Transmitter Section (B)
PIN 6	Vcc_TX	+3.3 volt supply for the Transmitter Section (A)
PIN 7	TX_GND	Ground (A)
PIN 8	TX_DIS	Transmitter Disable (A)
PIN 9	TD+	Transmitter Data Non-Inverted Differential Input (A)
PIN 10	TD-	Transmitter Data Inverted Differential Input (A)
Attaching Posts		The attaching posts are at case potential and may be connected to chassis ground. They should not be connected to circuit ground.



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